Response to comments of "MIXv2: a long-term mosaic emission inventory for Asia (2010-2017)" - #1

The work of Li et al. developed a new emission inventory, MIXv2, for 2010-2017, following an emission mosaic approach. By incorporating the best available regional emission inventories, MIXv2 now represents the state-of-the-art long-term emissions over Asia. Seven sectors and ten chemical species are included, providing the essential emissions input for both atmospheric and climate models. Gridded emissions at a high spatial resolution (0.1 degree) are publicly available to the community. This updated inventory data are critical to improve our understanding of the sources and atmospheric chemistry over Asia. The manuscript is in general well organized, with solid analyses and nice figures. My comments are mainly technical, as listed below.

Response: Thanks for the reviewer's positive and constructive comments. Below we have addressed the comment one by one and revised the manuscript accordingly.

Line 47 – 49: Can you provide 1-2 sentences on how the data can contribute to the community in the abstract?

Response: Thanks for the comment. We add the following statement by the end of the abstract:

This updated long-term emission mosaic inventory is ready to facilitate air quality and climate model simulations, as well as policy-making and associated analyses.

Line 126: not only regional emission inventories, but also two global inventories are used in the mosaic process. Please revise the sentence to "seven regional and two global emission inventories". Also, please revise accordingly in Line 139.

Response: We thank the reviewer's comment. We revise the sentence as suggested.

Line 153: can you elaborate more on how to develop the gridded CO2 emissions here?

Response: Thanks for the comment. We clarified the CO_2 emissions processing procedure as follows:

In detail, we firstly calculated the total CO_2 emissions of Japan by multiplying the CO_2 to NO_x ratios and JPN's NO_x emission estimates by sectors, then we developed the spatial proxies based on the NOx gridded emissions of JPN. Lastly, the calculated CO_2 emissions were allocated to each grid month by month.

Line 161: please specify the vegetation types in detail.

Response: We specified the vegetation types as below:

Wildfires of various vegetation types (including savanna, forest, peatland)

Line 369 – 370: To make it easier for readers to follow, can you put a short summary for Sect. 4 here?

Response: We thank the reviewer's comment. The following summary is added at the end of Sect. 2.5:

In short summary, generally consistent emission estimates and trends over Asia are found based on bottom-up and top-down comparisons in Sect. 4. Discrepancies persist, especially in regions like South Asia and SEA, as well as among species like BC and NMVOC.

Line 452 – 454: how about OEA, OSA and SEA? You only mentioned China and India in this paragraph.

Response: Thanks for the comment. Relatively small emission changes are estimated for OEA (-0.2 Tg) and OSA (+0.6 Tg). Significant emissions growth from power plants drives the total anthropogenic increase by 44%, and a 41% rise when considering additional open biomass burning for SEA. We add the analyses in the revised manuscript.

Line 586: Fig. S2 is for open biomass burning. Please add it to make the sentence clearer.

Response: Revised to *Fig. S2 (featuring open biomass burning)*.

Line 649: The title of Figure 11 is ambiguous. Please change "Emissions (right columns)" to "2010 and 2017 emissions (right columns)".

Response: Revised.

Line 697: do you mean different data sources of inventories? Please rephrase this sentence.

Response: We revise the sentence as suggested:

More validations and revisions are needed to identify the reasons of the discrepancies and narrow down the gaps.

Line 724: temporal resolution to high temporal resolution, chemical speciation to detailed chemical speciation.

Response: Revised.